

## REMARKS

The applicants appreciate the Examiner's thorough examination of the Application and request reexamination and reconsideration of the Application in view of the following remarks.

The Examiner has allowed claims 28, 30-38, 40 and 43-44. Applicants would like to thank the Examiner for the indication of allowable subject material.

Claims 1-9, 14-27 and 41-42 stand rejected under 35 USC §102(b) as allegedly being anticipated by U.S. Patent No. 5,735,332 to Ritland et al. To expedite prosecution, Applicants herein cancel apparatus claims 1-27 and 41-42. Since each of these claims have been cancelled, the rejection under 35 USC §102(b) is moot.

The subject invention results from the realization that a more durable metal matrix composite with a higher tensile strength and which sufficiently retains its tensile strength and stiffness at elevated temperatures is effected by the use of a partially sintered reinforcement preform tailored to have a specified pore size, porosity, and flexure strength, by choosing substantially pure ceramic powders, and by carefully selecting the metal matrix material, which can be aluminum, magnesium, or an alloy of these, to be infused into the preform depending on the choice of the ceramic powders. Ceramic powders are partially sintered resulting in an isotropic reinforcement preform. The preform is infused with a metal matrix material under pressure by pressure casting, squeeze casting, or similar techniques, which results in an isotropic metal matrix composite with high strength, high stiffness, temperature resistance, a low coefficient of thermal expansion, and good wear resistance properties.

In the Office Action dated July 14, 2005, the Examiner agreed with Applicants' assertion and stated that "Ritland et al. teaches away from the method [of infusing a metal matrix] under pressure by the discussion of the disadvantage of squeeze casting and applying pressure to

molten metal and by preferably conducting the method in a vacuum.” Thus, Applicants herein add new claims 45-66 which are directed to methods of making a metal matrix composite. No new matter is added and no new issues are raised because new method claims 45-66 include features similar to cancelled apparatus claims 1-9, 11-22 and 27. Claims 45-66 are also allowable over the prior art since independent method claims 45, 58, 62, and 66 each include the feature that a metal matrix composite is made by the step of infusing a metal matrix under pressure, which the Examiner has indicated as being allowable.

Ritland et al. shows a method for making a ceramic metal composite that includes pre-sintering a green body of alumina powder for three minutes at 1500° C and then placing the pre-sintered body into a sintering furnace that sinters the alumina body for about 80 minutes at a temperature of 1600° C. See Ritland et al. at column 10, lines 12-29. Next, metal is infiltrated into the preform preferably in the presence of a vacuum atmosphere. Ritland et al states that “[the] evacuation of air from the ceramic void space reduces the likelihood that air pockets will form in the metal infrastructure.” See Ritland et al. at column 8, lines 58-63.

In contrast to Ritland et al., the metal matrix composite as claimed by Applicants infuses the metal matrix under pressure, such as by pressure casting, squeeze casting, or other similar techniques, into a preform that includes partially sintered ceramic particles. The metal matrix material is selected from aluminum, magnesium or an alloy of these. As noted above, using pressure to infuse the preform with one of these metal matrix materials results in an isotropic metal matrix composite with high strength, high stiffness, temperature resistance, a low coefficient of thermal expansion, and good wear resistance properties.

Claim 45 of the subject application recites a "method of making a metal matrix composite, the method comprising: partially sintering ceramic particles to form an isotropic

reinforcement preform; and infusing a metal matrix under pressure into the preform yielding an isotropic metal matrix composite having an ultimate tensile strength of at least 80 ksi in all directions, the metal matrix material selected from the group consisting of aluminum, an aluminum alloy, magnesium or a magnesium alloy". As discussed above, Ritland et al. does not teach, disclose or suggest a method of making a metal matrix composite that includes a metal matrix infused under pressure into the preform, as claimed by Applicants. Independent claims 45, 58, 62 and 66 each includes similar features that distinguish over Ritland et al.

Accordingly, new claims 45-66 are patentable over Ritland et al.

Claims 11-13 stand rejected under 35 USC §103(a) as allegedly being unpatentable over Ritland et al. Also, claim 13 stands rejected under 35 USC §112, second paragraph. Since each of these claims have been cancelled, these rejections are moot.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates collect in Waltham, Massachusetts, at (781) 890-5678.

Respectfully submitted,



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